

WHAT IS CLAIMED IS:

- 1 1. An endoluminal apparatus comprising:
2 an elongated main body having a proximal end, a distal end configured for
3 advancement through a body lumen, and at least one lumen extending therethrough, the main
4 body having at least a first section near the proximal end, a second section therebetween and
5 a third section near the distal end, wherein
6 the first section is deflectable,
7 the second section is laterally stabilized and deflectable independently
8 of the first section in only a single plane, and
9 the third section is steerable independently of the second section.
- 1 2. The apparatus of claim 1, wherein the second section and/or third
2 section are independently lockable in a deflected position.
- 1 3. The apparatus of claim 1, wherein the second section is capable of
2 forming an arc which traverses approximately 270 degrees.
- 1 4. The apparatus of claim 3, wherein the arc has a radius of curvature
2 between about 5 and 12 centimeters.
- 1 5. The apparatus of claim 1, wherein the third section is steerable to
2 direct the distal end within any axial plane in a 360 degree circumference around the second
3 section.
- 1 6. The apparatus of claim 5, wherein the third section is steerable to
2 direct the distal end within only one of the axial planes in a 360 degree circumference around
3 the second section.
- 1 7. The apparatus of claim 5, wherein the third section is further steerable
2 to direct the distal end within any plane perpendicular the any axial plane.
- 1 8. The apparatus of claim 1, wherein the at least one lumen is sized for
2 passage of an endoscope.
- 1 9. The apparatus of claim 1, wherein the elongated main body includes an
2 endoscope.

1 10. The apparatus of claim 1, wherein at least one of the at least one lumen
2 terminates in a side opening near the distal end.

1 11. The apparatus of claim 10, wherein the side opening is located within
2 the second section.

1 12. The apparatus of claim 1, wherein at least one of the sections is
2 comprised of a plurality of adjacent links.

1 13. The apparatus of claim 1, wherein the first section is comprised of a
2 continuous length of material.

1 14. The apparatus of claim 1, further including a bite block mounted on the
2 main body near the proximal end.

1 15. The apparatus of claim 1, wherein the at least one lumen comprises a
2 suction lumen extending axially along the main body.

1 16. The apparatus of claim 15, wherein the suction lumen is joined with a
2 suction cap near the distal end, the suction cap including a port disposed perpendicularly to a
3 longitudinal axis of the main body.

1 17. The apparatus of claim 16, wherein the main body includes a scope
2 extending axially along the main body.

1 18. The apparatus of claim 17, wherein the scope has a distal end disposed
2 within the suction cap.

1 19. The apparatus of claim 17, wherein the suction cap includes an exit
2 port positioned to allow passage of a distal end of the scope therethrough.

1 20. An endoluminal apparatus comprising:
2 an elongated main body having a proximal end, a distal end configured for
3 advancement through a body lumen, and at least one lumen extending therethrough, the main
4 body having at least a first section near the proximal end, a second section therebetween and
5 a third section near the distal end, wherein

6 the second section is comprised of a plurality of adjacent links,
7 wherein each link is configured to allow rotation in a single plane and the links are arranged
8 so that the second section is laterally stabilized and deflectable in only the single plane, and
9 the third section is comprised of a plurality of adjacent links, wherein
10 each link is configured to allow rotation and the links are arranged so that the third section is
11 steerable in a plurality of planes.

1 21. The apparatus of claim 20, wherein the links of the second section are
2 pivotally connected by hinge structures, wherein the hinge structures comprise pivot pins
3 which are arranged in parallel to limit deflection to the single plane.

1 22. The apparatus of claim 20, wherein each link of the second section is
2 contoured to mate with an adjacent link so that rotation is allowed in the single plane and
3 resisted in a plane perpendicular to the single plane.

1 23. The apparatus of claim 22, wherein each link of the second section has
2 the same shape.

1 24. The apparatus of claim 22, wherein at least one of the links of the
2 second section comprises a bump link or a saddle link.

1 25. The apparatus of claim 20, wherein each link of the third section is
2 contoured to mate with an adjacent link and rotate in the plurality of planes so that rotation of
3 each link allows steering of the distal end in the plurality of planes.

1 26. The apparatus of claim 25, wherein at least one of the links in the third
2 section is comprised of a nestable element.

1 27. The apparatus of claim 20, wherein each link of the third section is
2 contoured to mate with an adjacent link and rotate in a single plane, and wherein the links are
3 arranged so that rotation of each link allows steering of the distal end in the plurality of
4 planes.

1 28. The apparatus of claim 27, wherein the links of the third section are
2 arranged so that each link is able to rotate in a single plane which is perpendicular to the
3 single plane of rotation of the link immediately adjacent.

1 29. The apparatus of claim 28, wherein at least one of the links in the third
2 section is comprised of a bump link, pin link, a pin nested link or a rattlesnake link.

1 30. The apparatus of claim 29, wherein the at least one link in the third
2 section is comprised of a plurality of pin nested links, wherein the plurality pin nested links
3 comprises at least a first link and an adjacent second link, the first link having a pin which is
4 slidably engageable with a slot in the adjacent second link.

1 31. The apparatus of claim 20, wherein the first section is comprised of a
2 plurality of adjacent links, wherein each link is configured to allow rotation and the links are
3 arranged so that the third section is deflectable in a plurality of planes.

1 32. The apparatus of claim 31, wherein the first section is contoured to
2 mate with an adjacent link and rotate in a single plane, and wherein the links are arranged so
3 that rotation of each link allows steering in the plurality of planes.

1 33. The apparatus of claim 32, wherein the links of the first section are
2 arranged so that each link is able to rotate in a single plane which is perpendicular to the
3 single plane of rotation of the link immediately adjacent.

1 34. The apparatus of claim 33, wherein at least one of the links in the first
2 section is comprised of a bump link, pin link, a pin nested link or a rattlesnake link.

1 35. The apparatus of claim 20, wherein the first section is comprised of a
2 continuous length of material.

1 36. The apparatus of claim 35, wherein the material is selected from the
2 group consisting of polyvinyl chloride, polyurethane, nylon and a combination of any of
3 these.

1 37. The apparatus of claim 20, wherein the first section and second section
2 are comprised of identical links.

1 38. The apparatus of claim 20, wherein the main body includes at least one
2 locking mechanism which locks at least a portion of the main body in a desired configuration.

1 39. The apparatus of claim 38, wherein the at least one locking mechanism
2 locks the second section independently of the third section.

1 40. The apparatus of claim 38, wherein the at least one locking mechanism
2 locks the first section independently of the second section.

1 41. The apparatus of claim 38, wherein the at least one locking mechanism
2 locks each of the sections independently.

1 42. The apparatus of claim 38, wherein the main body includes a torque
2 transmitting feature which provides torque transmission between the proximal and distal ends
3 while the main body is unlocked and able to form a desired configuration.

1 43. The apparatus of claim 20, wherein the at least one lumen comprises a
2 suction lumen extending axially along the main body.

1 44. The apparatus of claim 43, wherein the suction lumen is joined with a
2 suction cap near the distal end, the suction cap including a port disposed perpendicularly to a
3 longitudinal axis of the main body.

1 45. The apparatus of claim 44, wherein the main body includes a scope
2 extending axially along the main body.

1 46. The apparatus of claim 45, wherein the scope has a distal end disposed
2 within the suction cap.

1 47. The apparatus of claim 45, wherein the suction cap includes an exit
2 port positioned to allow passage of a distal end of the scope therethrough.

1 48. An endoluminal apparatus comprising:
2 an elongated main body having a proximal end and a distal end configured for
3 advancement through a body lumen,
4 the main body having at least a first section near the proximal end, a second
5 section therebetween and a third section near the distal end, wherein the second section is
6 deflectable independently of the first section and is capable of forming an arc which traverses
7 approximately 270 degrees, and

8 the main body having at least one lumen passing from the proximal end to a
9 side opening positioned within the second section facing the inside of the arc.

1 49. The apparatus of claim 48, wherein the at least one lumen is sized for
2 passing an endoscope therethrough.

1 50. The apparatus of claim 49, wherein the side opening positioned so that
2 the endoscope is directed to allow visualization of the distal end.

1 51. The apparatus of claim 48, wherein the at least one lumen is sized for
2 passing a tool arm therethrough.

1 52. The apparatus of claim 48, wherein the main body further includes at
2 least one lumen passing from the proximal end to the distal end.

1 53. An endoluminal access system comprising:
2 an elongated main body having a proximal end, a distal end configured for
3 advancement through a body lumen, and at least one lumen extending therethrough, the main
4 body having at least a first section near the proximal end, a second section therebetween and
5 a third section near the distal end, wherein
6 the first section is deflectable,
7 the second section is laterally stabilized and deflectable independently
8 of the first section in only a single plane, and
9 the third section is steerable independently of the second section; and
10 a bite block mountable on the main body near the proximal end.

1 54. The system of claim 53, wherein the bite block includes an orifice
2 through which the main body is passable.

1 55. A suction system comprising:
2 an elongated main body having a distal end, a proximal end, and at least one
3 lumen extending over or through at least a distal section of the elongated main body, the main
4 body having at least one shape-lockable portion along its length and the at least one lumen
5 including a suction lumen; and

6 a suction cap coupled with the suction lumen near the distal end of the
7 elongated body, the suction cap including a port disposed perpendicularly to a longitudinal
8 axis of the main body.

1 56. A system as in claim 55, wherein the at least one lumen includes an
2 instrument lumen configured to guide an instrument therethrough to within the suction cap.

1 57. A system as in claim 56, wherein the instrument lumen is configured to
2 guide the instrument axially across the port while remaining within the suction cap.

1 58. A system as in claim 57, further comprising a needle advanceable
2 through the instrument lumen and axially across the port while remaining within the suction
3 cap.

1 59. A system as in claim 55, further comprising a scope having a proximal
2 end and a distal end, the scope advanceable through one of the at least one lumen of the main
3 body.

1 60. A system as in claim 59, wherein the distal end of the scope is
2 advanceable to within the suction cap.

1 61. A system as in claim 60, wherein the suction cap includes an exit port
2 positioned to allow passage of a distal end of the scope from within the suction cap to outside
3 of the suction cap.

1 62. A system as in claim 59, wherein the distal end of the scope is
2 advanceable beyond the distal end of the main body and wherein the distal end of the scope is
3 directable to view the suction cap from outside of the suction cap.

1 63. A system as in claim 62, further comprising a suction tube extending
2 through the suction lumen and extending beyond the distal end of the main body, the suction
3 lumen coupled with the suction cap.

1 64. A system as in claim 63, wherein the suction cap includes a grasping
2 feature which is graspable for positioning the suction cap independently of the main body.

1 65. A system as in claim 64, further comprising a grasper advanceable
2 through the main body and configured to grasp the grasping feature.

1 66. A system as in claim 65, wherein the grasper is advanceable through a
2 lumen in the scope.

1 67. An endoluminal apparatus comprising:
2 an elongated main body having a proximal end, a distal end configured for
3 advancement through a body lumen, and at least one lumen extending therethrough, the main
4 body having at least a first section near the proximal end and a second section near the distal
5 end,
6 wherein the first section is configured to shape-lock, and
7 wherein the second section is configured to retroflex.